U. S. DEPARTMENT OF ENERGY
1993 SITE ENVIRONMENTAL REPORT FOR ROCKY FLATS

Attached for your information is the 1993 Site Environmental Report for Rocky Flats Environmental Technology Site. In addition to summaries of radiological and nonradiological monitoring, the report includes summaries of environmental activities on the site, a listing of the major environmental permits along with the compliance status of each, and descriptions of National Environmental Policy Act activities.

We have also attached a summary covering significant environmental events in 1994. This is representative of our ongoing program to place greater emphasis on identifying potential environmental compliance issues at Rocky Flats and developing solutions to those problems in a timely and cost-effective manner to protect the health and safety of our employees and neighbors, while protecting the environment.

If you have any questions about the report, or would like to discuss particular items within the report, please contact the DOE Rocky Flats Field Office (Beth Brainard) at (303)966-5993.

Mark N. Silverman
Manager

Rocky Flats Environmental Technology Site

1994 ENVIRONMENTAL SUMMARY

(NOTE: In July of 1994, Rocky Flats Plant was renamed Rocky Flats Environmental Technology Site and the Colorado Department of Health also changed its name to the Colorado Department of Public Health and Environment. Most of the events and issues noted in this summary occurred prior to those name changes and therefore, prior names have been retained for this summary.)

Compliance Issues

Residues Meet Judicial Order

All requirements identified in the February 1994 judicial order issued by federal judge Lewis T. Babcock regarding the ongoing Sierra Club lawsuit on mixed residues were delivered to CDH. The judicial order required revised drawings of rooms to be permitted for storage of mixed residues, smoke-test results and air-flow patterns for five vaults, a proposal for relabeling containers, a proposal for a 180-day schedule for closure of container storage units, and a quarterly progress report discussing the status of these requirements. All deliverables were acceptable to CDH and CDH is currently drafting a Resource Conservation and Recovery Act (RCRA) Part B Permit for the rooms intended for storage of mixed residues in drums. A follow-up judicial order was issued in August 1994 to cover additional waste units.

Closure of Operable Unit 16

Operable Unit (OU) 16 consisted of 5 Individual Hazardous Substance Sites at RFP. A Corrective Action Decision/Record of Decision for OU 16 was signed and adopted by EPA and CDH in October 1994. This is the first OU to be closed at RFP.

Update on Boundary Wells

First-quarter data for the east boundary (Indiana St.) wells were retrieved on June 20, 1994. There were no detected Volatile Organic Compounds (VOCs) in samples collected during that period. Of those metals having an EPA primary drinking water standard, only a single value for selenium exceeded the standards, and the result was below the value of the background plus two standard deviations. None of the results for dissolved radionuclides were above the value of the background mean plus two standard deviations. Both plutonium and americium activities were less than 0.05 pCi/L for all boundary wells.

Three new wells are currently being installed in the Walnut Creek drainage: one upgradient and two downgradient of Well 41691. Surface casing has been installed for the two offsite wells downgradient of 41691. Data from these wells are expected to verify that RFP is not adversely impacting residential groundwater drinking water. Monitoring data from old wells in this drainage area were inconclusive. Therefore a more conservative approach was taken in the past for assessing the radiation dose to the public in the drinking water pathway. That approach assumed that the drinking water source for the calendar year 1993 was Pond C-2 and was very conservative. When more reliable data are available from the new boundary wells, a more appropriate approach will be applied.

Hazardous Waste Compliance Program Plan (HWCPP)

RFP has developed the HWCPP to institute an effective program for sustained compliance with RCRA requirements. Efforts are underway to identify RCRA deficiencies and to correct them in a timely manner. RFP is working with CDH to address the continued implementation of the HWCPP as well as the course of future actions involving hazardous waste.

Pond Water Management

Region VIII of EPA formally denied DOE, RFFO's request for a 60-day delay to allow the DOE, RFFO manager to examine issues relating to the Pond Water Management Interim Measures/Interim Remedial Action (IM/IRA). Under the IAG, DOE can invoke dispute resolution, but unlike previous disputes, EPA is holding DOE to the milestones assigned by EPA on January 10, 1994, claiming stipulated penalties will accrue during the dispute period. Response alternatives are being developed.

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Compliance Issues (cont'd)

Solar Pond Sludge Removal
Upon approvals by CDH, work was completed on sludge removal from Solar Pond B-South as the first step in remediation and final closure of the ponds under RCRA and CERCLA regulations. The sludge was removed from the pond using a vacuum truck and transported for placement in 10,000 gallon polyethylene tanks for temporary onsite storage. Seventy tanks are located in tents at a permitted storage area in the 750 area. The emptying of 200,000 gallons of sludge was completed the first week in May; the sludge filled 27 of the 70 storage tanks. Emptying of approximately 250,000 gallons of sludge from Pond C is now in progress. Final removal of all sludges is scheduled to be completed by the January 20, 1995 IAG milestone due date.

IAG Milestones
RFP missed several administrative milestones related to environmental cleanup activities and DOE agreed to pay $2.8 million as part of a settlement agreement with EPA and CDH.

Decanted Pond Water Spilled During Transport
On March 31, 1994, approximately 35 gallons of decanted (no sludge) pond water was released to the asphalt during transport from the 750 Pad to the 231 tanks. This water was reported to have 1150 pCi/L alpha radiation and a pH level of 10 when the sample was evaluated on March 30, 1994. A radiation survey was made at the spill locations along the route of the tanker truck and on the surface of the truck. All surveyed areas were found to be below background level. The National Response Center was notified, a contingency plan was implemented, and all tanker operations from this area were temporarily curtailed. No adverse effects to the health and safety of the public, RFP personnel, equipment, facilities, or the environment occurred.

Colorado Water Quality Control Commission
At the South Platte River triennial rule-making hearing of April 4, 1994, RFP requested and was granted an extension of the temporary modifications of site-specific radionuclide standards until December 31, 1996. A decision on the RFP petition to remove the aquatic life classification for Segments 4 and 5 of Big Dry Creek was deferred until May 1995.

CDH Inspections
CDH inspected the 750/904 pads on April 14, 1994 and identified no concerns over the pad runoff water quality; as a result, no changes in monitoring were required.

Residue Elimination Project Conceptual Design Report
The final Conceptual Design Report (CDR) was published on May 17, 1994 and represents a baseline for the Residue Management Program. The CDR describes a method to treat residues for shipment and disposal using a comprehensive facility. The CDR responds to the requirements of the April 1993 Compliance Order.

Solution Stabilization
Seven batches of toxic characteristic metal wastes and 18 neutralized D002 drums had been processed by June 1994 through the Building 774 Bottle Box in support of Phase I Solution Stabilization.

SARA Title III - Tier II (Form R)
RFP submitted the EPCRA Tier II Report to state and local emergency planning agencies. The report listed hazardous and extremely hazardous substances stored above certain reporting thresholds during the 1993 reporting year.

The Toxic Chemical Release inventory was submitted to the state and EPA on June 30, 1994. The inventory listed chemicals used on plantsite in excess of 10,000 pounds during the 1993 reporting year.

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Compliance Issues (cont'd)

National Environmental Policy Act (NEPA)
The following environmental assessments (EAs) were approved and each received a Finding of No Significant Impact (FONSI):

- New Sanitary Landfill (DOE/EA-0914), March 7, 1994
- Drum Storage Facility for Interim Storage of Material Generated by Environmental Restoration Operations (DOE/EA-0995), September 7, 1994

The following Categorical Exclusions were approved by DOE:

- Electrochemical Chlorination Tests, February 3, 1994
- Ultraviolet Oxidation Testing, February 3, 1994
- Background Soils Characterization, May 5, 1994
- Well Abandonment and Replacement Program, June 2, 1994
- Decontamination Water Treatment Facility, June 15, 1994
- Reactive Chemical Destruction, June 17, 1994

Chemical Consolidation
Phase 1 of the Excess Chemical Program was completed on July 28, 1994. There were approximately 14,000 excess chemicals identified within forty-seven buildings during this program and 4,139 of these were characterized as RCRA regulated and were packaged into 328 drums. All of the chemicals have been removed and have been placed in regulated storage areas. The balance of the chemicals (approximately 6900) were characterized as non-RCRA and are awaiting funding in order to package and properly disposition them.

Building 779 Chiller Freon Loss
A chiller in Building 779 lost approximately 1,200 pounds of Freon-11, possibly due to manual purging of contaminants from the system. The loss did not meet the designation of catastrophic, nor was the chiller required to be registered with CDH until January 25, 1995. An action plan to help prevent similar leaks was developed and measures were taken to prevent reoccurrence.

Tank Management Program
The Tank Management Program is on track and will be completed by November 30, 1996. The current estimate of the number of tanks at RFP is 2687. The Tank Management Plan consists of an inventory categorization and integrity assessment of all above-ground storage tanks. A comprehensive inventory was completed in September 1994 in compliance with an EPA milestone.

Toxic Substances Control Act (TSCA) Program
RFP currently stores radioactive polychlorinated biphenyl (PCB) wastes in several buildings. An effort is underway to consolidate the radioactive PCB wastes into two buildings to allow all PCB wastes to be stored in storage areas which contain 6-inch berming as required by TSCA. RFP is pursuing a compliance agreement with EPA to allow for continued storage of radioactive PCB wastes beyond the one-year time limit as specified in 40 CFR Part 761. The compliance agreement is expected to be finalized by the end of the 1994 calendar year.

Significant Events

Low-Level Waste Shipments Approved
On January 18, 1994, RFP received written approval from the Nevada Test Site (NTS) to ship and dispose of low-level waste (LLW) generated throughout the plantsite.

Grass Fire in Buffer Zone
On March 22, 1994, a grass fire occurred in the northeast portion of the RFP Buffer Zone, three quarters of a mile west of Indiana Street and Highway 128 intersection. The fire consumed approximately 75 acres and could be seen from 15 miles away. The probable cause was discarded material (such as a cigarette butt). The grass fire was the largest in the last 17 years at RFP. Firefighters had to chase it for about three-quarters of a mile before it was stopped on the south side by a firebreak road. The boundaries of the fire did not encroach on any identified cleanup areas on the RFP site. The area is not downwind from any of the historical air releases from RFP that have resulted in soil contamination. Sampling of the area found no above-background radioactive contamination.

Secretary of Energy Visits RFP
Secretary of Energy, Hazel O'Leary visited RFP on March 24 and 25, 1994. Her agenda included discussion of declassification of secret information, cleanup of the RFP site, and change of the mission of the site from weapons production to environmental restoration.

Stormwater Flow Control Structures Rated
A large snowmelt runoff event on April 12, 1994 provided an excellent opportunity to make discharge measurements for rating flow control structures in the RFP stormwater monitoring network. Data from staff gages, flow meters, and crest stage indicator were collected and samples of suspended sediment were taken. Data from this field work were submitted to the United States Geological Society (USGS).

Decontamination of Uranium-Contaminated Scrap
Approximately 14,000 pounds of uranium-contaminated scrap metal was decontaminated over a two-year pilot program. Surveys showed that the treated material was clean enough to be sold to private scrap metal vendors after being decontaminated by means of carbon dioxide pellet blasting.

Small Mammal Trapping
The spring small mammal live-trapping exercise under the Ecological Monitoring Program (EcMP) was conducted at four sites representing riparian, mesic, xeric, and reclaimed communities. One hundred traps were baited and set at each site for three consecutive nights. Preliminary results showed the predominance of the deer mouse at most sites. Small mammals are often used as evaluation tools because of their close association with contaminants (especially soil contaminants) and because of their importance as a food source for other mammals, reptiles, and birds.

During the spring mammal trapping exercise at a xeric grassland site, the EcMP team captured a new mouse species for RFP, the plains pocket mouse.

Preliminary habitat characterization studies were initiated for the Preble's Meadow Jumping Mouse (Zopus Hudsonius Preblei), which has been petitioned to be listed as an endangered species.

Soil Vapor Extraction Project
When the pilot project for testing soil vapor extraction in the East Trenches of OU 2 ended on June 6, 1994, a total of 260 pounds of VOCs had been removed from the soils and treated. Begun on February 6, 1994, the technique removes air containing VOCs from unsaturated soil. The process includes injecting fresh air or creating a vacuum in the subsurface so the vapor-laden air can be withdrawn from the recovery or extraction wells, thereby reducing public and worker exposure.

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Significant Events (cont'd)

ALARA Control Level
In June 1994, the RFP As Low As Reasonably Achievable (ALARA) Oversight Committee lowered the site whole-body Administrative Control Level (ACL) from 1 rem to 0.75 rem per year (750 mrem). The change was based on a decreasing trend in site radiation dose data for the past two years. The ACL was lowered in September 1993 from 1.8 rem to 1 rem per year. ACL is synonymous with Administrative Dose Guide (ADG), and is a numerical dose constraint established at a level below the regulatory limits to administratively control and help reduce individual and collective doses. The whole-body ACL does not include dose equivalents from internal exposure which occurred in previous years. It is established to control whole-body radiation doses below the federal limit of 5 rem per year and the DOE ACL limit of 2 rem per year. The ACL is reviewed annually and may be raised or lowered depending on prevailing dose data.

New Sanitary Landfill
The new site sanitary landfill is designed to the latest federal and state regulations and will be located in the Buffer Zone northwest of the site's main industrial area. The Title II engineering design was completed in June 1994 and the construction contract was awarded in October 1994. Both Jefferson County and the CDH reviewed and approved the permit application (Certificate of Designation) in September 1994.

Teacher Research Associates (TRAC) Program
Two high school teachers were sent to RFP under DOE's Teacher Research Associates Program during the summer of 1994 and were assigned to the Ecology and NEPA Division to work on general research topics in their fields of expertise.

Comprehensive Waste Management Plan (CWMP)
The CWMP was completed and submitted to CDH by October 1, 1994. This first version of the CWMP focuses on RFP waste storage planning. Annual updates will be provided and the scope will be expanded to include other elements of waste management.

Water Leak in Building 881
On July 23, 1994, a 1,000-gallon water leak was discovered in Building 881 which houses a central computer facility, general laboratories, and offices on the south side of RFP. The leak activated the emergency operations center but was contained onsite. Tests of the water found no radioactivity above background levels.

Low-Level Waste Shipments
By September 30, 1994, RFP had shipped a fiscal year-to-date total of 10,878 cubic feet of LLW to NTS and 4032 cubic feet of low level sewage sludge to Hanford. Projected shipment goals were 5,920 and 1,400 cubic feet respectively.

Los Alamos Hired for Cleanup Activities
DOE officials announced that the Los Alamos National Laboratory has been hired to develop unique technical approaches to environmental cleanup and restoration activities at RFP. Valued at $30 to $50 million, the work began in October 1994. Environmental remediation technology and plutonium residue treatment processes will be jointly developed at Los Alamos by Los Alamos and RFP employees. The technology and processes will be transferred to RFP.

Nuclear Operations Suspended
Operations involving nuclear material were temporarily suspended October 7, 1994 after an unauthorized process line in Building 771 was opened in violation of procedures for draining tanks. Although the incident resulted in no threat to the public, workers, or the environment, it was the most serious safety breach occurring at RFP in recent times. As a result of the incident, movement, transfer, and process operations involving fissile material were suspended until further notice. The suspension applies to activities such as solution stabilization, thermal stabilization, residue repackaging and characterization, among others. Operations will restart on a graded approach only after readiness assessments are conducted and subsequently approved by the DOE, RFFO Manager.

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Activities Completed Ahead Of Schedule And/Or Under Budget

The scoping of the saltcrete characterization project to achieve RCRA and Land Disposal Restriction compliance was completed more than one year ahead of schedule.

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Title I design of Sewage Treatment Plan Upgrades Phase II was performed and completed. The final costs for this portion of the project were $94,600 under budget.

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The Kansas City Equipment Relocation project saved $333,000 by eliminating the need for construction management and by using simplified engineering package technology.

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A total of $185,000 was saved as a result of improvements in the building emergency plan development process. In addition, the Emergency Supplies Trailer and Emergency Control Station Trailer were eliminated which resulted in a cost savings of approximately $42,000.

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Two thousand gallons of diesel fuel from Building 771 were shipped in support of the effort to empty the underground storage tanks for remediation. By shipping bulk, approximately $25,000 was saved.

Performance Improvement Team efforts on plant procedures resulted in a savings of $33,229 for work packages related to fire protection activities.

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The Building 374 Waste System Evaporator project was rescoped to be in line with the changing plant mission. The new scope of the project is estimated to cost $18.4 million, a $3 million dollar reduction from the original total project cost.

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Over $100,000 in construction costs were saved by determining that a liner for the South Interceptor Ditch and subsequent wetland mitigation were not needed. The seep flow below the South Interceptor Ditch was determined to be groundwater and not surface water discharge from the ditch.

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A demonstration of the use of electrochemical chlorination to destroy cadmium cyanide solution in plating bath waste was completed in May 1994. The study was completed under budget and demonstrated successful destruction of low-level mixed waste.

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Cost productivity savings of $3.8 million dollars were realized in the Building 371 Stabilization program.

Errata for 1992 Site Environmental Report

Surface Water Confidence Interval Corrective Information for 1992 Site Environmental Report

The reported confidence intervals for selected surface water radionuclide data reported in the **1992** Annual Site Environmental Report (SER) were incorrect. **The reporting error applies only to the calculated confidence intervals associated with radionuclide data and not to the reported radionuclide data itself.** The incorrectly calculated confidence intervals affected isotopic results reported in the 1992 SER. The confidence intervals for these selected radionuclide data sets were reported as 1.0 standard deviation, a 67% confidence interval, rather than the published 1.96 standard deviation, a 95% confidence interval. A 95% confidence interval may be calculated by multiplying the reported error term value for all radionuclide information in the 1992 SER by 1.96. However, because of rounding of the contributing individual values, corrected uncertainties for arithmetic and volume-weighted averages will only approximate the 95% uncertainty. **The 1993 SER will not require modification as the data are reported correctly.**

ERRATA

Rocky Flats Environmental Technology Site
1993 Site Environmental Report

Pages: xxviii and xxix of the Executive Summary

Sections	Corrections
External Gamma Radiation Dose Monitoring (Last paragraph on page xxviii)	Delete the last sentence in the paragraph which reads: "These values are similar to those reported by the National Council on Radiation Protection and Measurement (NCRP) for background gamma radiation in the Denver area." Replace it with: "This dose is primarily from naturally occurring sources of radiation, and is similar to doses reported by the National Council on Radiation Protection and Measurement (NCRP) for background gamma radiation in the Denver area."
Radiation Dose Assessment (Last paragraph on page xxix)	Delete the last sentence in the paragraph which reads: "This dose is primarily from naturally occurring sources of radiation, and is similar to doses reported by the National Council on Radiation Protection and Measurement (NCRP) for background gamma radiation in the Denver area."

Page: 111 of Section 3.3 Surface-Water Monitoring
Replace Table 3.3-5 with the following corrected table:

Table 3.3-5 with error terms
Plutonium, Americium, and Uranium Concentrations in the Raw Water Supply

Analyte	Number of Analyses	C minimum[a, b]	C maximum[a, b]	C mean[a, c]	Percent of DCG (C mean)
Plutonium Concentration (x 10-9 µCi/ml)[d]	12	-0.014 ± 0.011	0.003 ± 0.003	-0.002 ± 0.003	-0.01
Americium Concentration (x 10-9 µCi/ml)[f]	12	-0.025 ± 0.015	0.003 ± 0.016	-0.002 ± 0.004	-0.01
Uranium-233, -234 Concentration (x 10-9 µCi/ml)[e]	12	0.01 ± 0.09	1.08 ± 0.35	0.45 ± 0.20	0.09
Uranium-238 Concentration (x 10-9 µCi/ml)[e]	12	0.01 ± 0.09	0.96 ± 0.32	0.36 ± 0.15	0.06

a. C minimum = minimum measured concentration; C maximum = maximum measured concentration; C mean = mean calculated concentration.
b. Calculated as 1.96 standard deviations of the individual measurement.
c. Calculated as 1.96 standard deviations of the mean (95% Confidence Interval).
d. Radiochemically determined as plutonium-239 and -240. The DOE Derived Concentration Guide (DCG) for plutonium in water available to members of the public is 30 x 10-9 µCi/ml (Appendix B).
e. Radiochemically determined as uranium-233, -234 and -238. The DOE DCG for uranium-233, -234 in water available to members of the public is 500 x 10-9 µCi/ml. The DCG for uranium-238 in water is 600 x 10-9 µCi/ml (Appendix B).
f. Radiochemically determined as americium-241. The standard calculated DCG for americium in water available to members of the public is 30 x 10-9µCi/ml (Appendix B).

The above errors were typographical in nature and not due to the technical information reported by the Subject Matter Experts.

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